

CLAIMS

What is claimed is:

1. A front gauge for a sheet bending brake, wherein the brake comprises a first longitudinally extending member forming a clamping surface, a second longitudinally extending member positioned over the first member and movable toward and away from the first member for clamping a sheet material workpiece against the clamping surface and having a longitudinal front edge forming a bending anvil, and a third longitudinally extending member pivotally mounted to the first member for bending over the bending anvil a workpiece that is clamped between the first and second members; wherein the brake is operable in any orientation and, regardless of orientation, "over" is defined to mean on the second member's side of the workpiece and "under" is defined to mean on the first member's side of the workpiece; the front gauge comprising:
 - a scale for gauging that extends outward from the front of the sheet bending brake; and
 - mounting that connects the scale to the brake such that the scale is positioned under the workpiece.
2. The front gauge according to claim 1, further comprising:
 - front mounting wherein the mounting comprises a bracket that attaches the scale to the third member.
3. The front gauge according to claim 2, wherein the mounting further comprises:
 - removable attachment of the bracket to the third member, the removable attachment comprising:
 - an open-ended track that extends longitudinally along at least a portion of the longitudinal extent of the third member; and
 - a slider affixed to the bracket and slidably retainable by the track.
4. The front gauge according to claim 3, wherein the mounting further comprises:
 - a level-surfaced adapter affixed between the track and the third member; and
 - a sliding support between the bracket and a suitable one of the track or the adapter or the third member.
5. The front gauge according to claim 1, further comprising:
 - under-mounting wherein the mounting comprises a support bar that passes under the first and third members such that a first end of the support bar is attached to the scale, and an opposed second end of the support bar is attached to a frame portion of the brake.

6. The front gauge according to claim 5, wherein the mounting further comprises removable attachment of the support bar to the frame portion, the removable attachment comprising:

at least one square tube coupling that is affixed under the frame portion and extends laterally, the at least one coupling being sized for slidably engaging with the second end of the support bar;

at least one manually tightenable set screw in a threaded hole through the coupling; and a base connecting the first end of the support bar to the scale.

7. The front gauge according to claim 6, wherein the mounting further comprises:

at least one mounting plate for affixing the at least one coupling to front and rear rails of the frame portion of the brake.

8. The front gauge according to claim 6, wherein the mounting further comprises:

a stop plate affixed on the support bar near the second end such that the stop plate abuts against the at least one coupling when the support bar is slidably engaged with the at least one coupling and is positioned at a predetermined position.

9. The front gauge according to claim 6, wherein:

the scale comprises a body that is slidably connected to the base; and

a spring is connected between the body and the base so as to bias the body inward against the third member.

10. The front gauge according to claim 9, further comprising:

a cam plate adjustably affixed to the third member and located at least between the body and the third member; and

a bottom portion of the cam plate that extends under and rearward of the third member when the third member is in an at-rest position.

11. The front gauge according to claim 9, further comprising:

a lockout pin; and

first and second holes for the lockout pin wherein the first hole passes through the body and the second hole passes through the base such that the second hole is aligned with the first hole when the body is slid outward to a predetermined offset distance from the brake.

12. The front gauge according to claim 1, wherein the scale further comprises any combination of one or more gauging indicators including:

ruled markings that indicate distance outward from the bending anvil;
ruled markings that indicate distance inward from a zero point that is a predetermined distance outward from the bending anvil;

an erasable temporary marking surface with hand made marks; and
5 a template strip.

13. The front gauge according to claim 12, wherein the scale further comprises:
a gauge bar with at least one scale groove or scale recess for removably and adjustably retaining a selected one of the gauging indicators.

14. The front gauge according to claim 1, further comprising:
10 a stop that is slidingly connected to the scale for sliding in and out.

15. The front gauge according to claim 14, further comprising:
a manually tightenable set screw in the stop.

16. The front gauge according to claim 14, wherein the stop further comprises:
a stop face that is normal to the scale, and that extends both over and under the scale.

15 17. The front gauge according to claim 14, further comprising:
a rotatable connection of the stop to the scale; and
an angle scale that indicates degrees of rotation of the stop.

18. The front gauge according to claim 17, wherein the stop further comprises:
a stop face that is normal to the scale, and that extends both over and under the scale.

20 19. A method for gauging a workpiece of sheet material in a sheet bending brake, wherein the brake comprises a first longitudinally extending member forming a clamping surface, a second longitudinally extending member positioned over the first member and movable toward and away from the first member for clamping the workpiece against the clamping surface and having a longitudinal front edge forming a bending anvil, and a third longitudinally extending member
25 pivotally mounted to the first member for bending over the bending anvil a workpiece that is clamped between the first and second members; wherein the brake is operable in any orientation and, regardless of orientation, "over" is defined to mean on the second member's side of the workpiece and "under" is defined to mean on the first member's side of the workpiece; the method comprising the step of:

30 mounting a scale for gauging in front of the brake such that a supporting surface of the scale is in the same plane as the clamping surface of the first member.

20. The method according to claim 19, further comprising the step of:
attaching the scale such that it is longitudinally slidable.
21. The method according to claim 19, further comprising the step of:
attaching the scale such that it is removable.
- 5 22. The method according to claim 19, further comprising the step of:
providing front mounting that attaches the scale to the third member.
23. The method according to claim 22, further comprising the step of:
providing one or more accessories that can be attached to the brake by the front mounting.
24. The method according to claim 23, wherein the one or more accessories are workpiece
10 supports.
25. The method according to claim 19, further comprising the step of:
providing under-mounting that attaches the scale to a frame portion of the brake under the
first and third members.
26. The method according to claim 25, further comprising the steps of:
15 spacing a plurality of universal mount couplings longitudinally along the brake; and
using the plurality of universal mount couplings for removably attaching the one or more
scales to the frame portion of the brake.
27. The method according to claim 26, further comprising the step of:
providing one or more accessories that can be removably attached to the brake by the
20 universal mount couplings.
28. The method according to claim 27, wherein the one or more accessories are selected
from the group consisting of a workpiece rack and a workpiece support.
29. The method according to claim 25, further comprising the steps of:
biasing the scale against the third member; and
25 adapting the third member such that it causes the scale to slide outward in response to
pivoting movement of the third member, thereby providing dynamic offset of the scale relative to
the bending anvil.
30. The method according to claim 25, further comprising the step of:
extending a U-shaped handle of the third member for allowing the handle to pass around
30 the scale during pivoting movement of the third member.
31. The method according to claim 19, further comprising the step of:

providing a static offset of the scale relative to the bending anvil.

32. The method according to claim 19, further comprising the steps of:

providing at least one gauging indicator for the scale; and

providing a gauge bar with at least one scale groove or scale recess for removably and

5 adjustably retaining a selected one of the at least one gauging indicators.

33. The method according to claim 19, further comprising the step of:

providing at least one gauging indicator that comprises ruled markings that indicate

distance inward from a zero point that is a predetermined distance outward from the bending
anvil.

10 34. The method according to claim 19, further comprising the step of:

providing at least one gauging indicator that comprises an erasable temporary marking
surface with hand made marks.

35. The method according to claim 19, further comprising the step of:

mounting the scale with attachments that are adjustable for aftermarket adaptation to

15 different brakes.

36. The method according to claim 19, further comprising the step of:

fixing an edge of the workpiece at a predetermined angle relative to the bending anvil by
pressing the workpiece outward against a stop face that is slidably attached to the scale such that
the stop face extends both over and under the scale in directions normal to the supporting surface
20 of the scale.

37. The method according to claim 36, further comprising the step of:

rotatably attaching the stop face to the scale.

38. A sheet bending brake with a gauge for gauging a sheet material workpiece in the
brake, wherein the brake comprises a first longitudinally extending member forming a clamping
25 surface, a second longitudinally extending member positioned over the first member and movable
toward and away from the first member for clamping a sheet material workpiece against the
clamping surface and having a longitudinal front edge forming a bending anvil, and a third
longitudinally extending member pivotally mounted to the first member for bending over the
bending anvil a workpiece that is clamped between the first and second members; wherein the
30 brake is operable in any orientation and, regardless of orientation, "over" is defined to mean on
the second member's side of the workpiece and "under" is defined to mean on the first member's

side of the workpiece; the brake further comprising:

at least one scale for gauging that extends outward from the front of the sheet bending brake; and

mounting that connects the at least one scale to the brake such that the at least one scale is positioned under the workpiece.

39. The brake according to claim 38, further comprising:

front mounting wherein the mounting comprises a bracket that attaches a one of the at least one scales to the third member.

40. The brake according to claim 39, wherein the mounting further comprises removable attachment of the bracket to the third member, the removable attachment comprising:

an open-ended track that extends longitudinally along at least a portion of the longitudinal extent of the third member; and

a slider affixed to the bracket and slidably retainable by the track.

41. The brake according to claim 40, wherein the mounting further comprises:

a level-surfaced adapter affixed between the track and the third member; and

a sliding support between the bracket and a suitable one of the track or the adapter or the third member.

42. The brake according to claim 39, further comprising:

one or more workpiece supports attached to the third member by the front mounting.

43. The brake according to claim 38, further comprising:

under-mounting wherein the mounting comprises a support bar that passes under the first and third members such that a first end of the support bar is attached to a one of the at least one scales, and an opposed second end of the support bar is attached to a frame portion of the brake.

44. The brake according to claim 43, wherein the mounting further comprises removable attachment of the support bar to the frame portion, the removable attachment comprising:

at least one square tube coupling that is affixed under the frame portion and extends laterally, the at least one coupling being sized for slidably engaging with the second end of the support bar;

at least one manually tightenable set screw in a threaded hole through the at least one coupling; and

a base connecting the first end of the support bar to the one of the at least one scales.

45. The brake according to claim 44, wherein the mounting further comprises:
at least one mounting plate for affixing the at least one coupling to front and rear rails of
the frame portion of the brake.

46. The brake according to claim 44, further comprising:
5 one or more accessories that are removably attached to the frame portion of the brake
using the at least one couplings.

47. The brake according to claim 46, wherein each one of the one or more accessories is
selected from the group consisting of a workpiece rack and a workpiece support.

48. The brake according to claim 47, wherein:
10 the workpiece rack comprises one or more vertical posts positioned rearward of the brake,
each of which is affixed to a forward extending support bar at the bottom, and to at least one
forward extending arm above, such that the support bar is slidably engagable with a selected one
of the at least one couplings; and

the workpiece support comprises a forward extending support bar affixed to a top surface
15 that is in the same plane as the clamping surface of the first member, and the support bar is
slidably engagable with a selected one of the at least one couplings.

49. The brake according to claim 44, wherein:
the mounting further comprises a stop plate affixed on the support bar near the second end
such that the stop plate abuts against the at least one coupling when the support bar is slidably
20 engaged with the at least one coupling and is positioned at a predetermined position;

each one of the at least one scales comprises a body that is slidably connected to the base;
a spring is connected between the body and the base so as to bias the body inward against
the third member;

a cam plate is adjustably affixed to the third member and located at least between the body
25 and the third member;

a bottom portion of the cam plate extends under and rearward of the third member when
the third member is in an at-rest position; and

first and second holes and a lockout pin fitting therethrough are provided wherein the first
hole passes through the body and the second hole passes through the base such that the second
30 hole is aligned with the first hole when the body is slid outward to a predetermined offset distance
from the brake.

50. The brake according to claim 43, further comprising:

a handle extension for extending a U-shaped handle on the third member such that during pivoting movement of the third member, the extended U-shaped handle can pass around a scale that is under-mounted within the span of the extended U-shaped handle.

5 51. The brake according to claim 38, wherein each one of the at least one scales further comprises any combination of one or more gauging indicators including:

ruled markings that indicate distance outward from the bending anvil;

ruled markings that indicate distance inward from a zero point that is a predetermined distance outward from the bending anvil;

10 an erasable temporary marking surface with hand made marks; and
a template strip.

52. The brake according to claim 51, wherein each one of the at least one scales further comprises:

15 a gauge bar with at least one scale groove or scale recess for removably and adjustably retaining a selected one of the gauging indicators.

53. The brake according to claim 38, further comprising:

a stop that is slidingly connected to a one of the at least one scales for sliding in and out;

a manually tightenable set screw in the stop; and

20 a stop face that is normal to the one of the at least one scales, and that extends both over and under the one of the at least one scales.

54. The brake according to claim 53, further comprising:

a rotatable connection of the stop to the one of the at least one scales; and

an angle scale that indicates degrees of rotation of the stop.